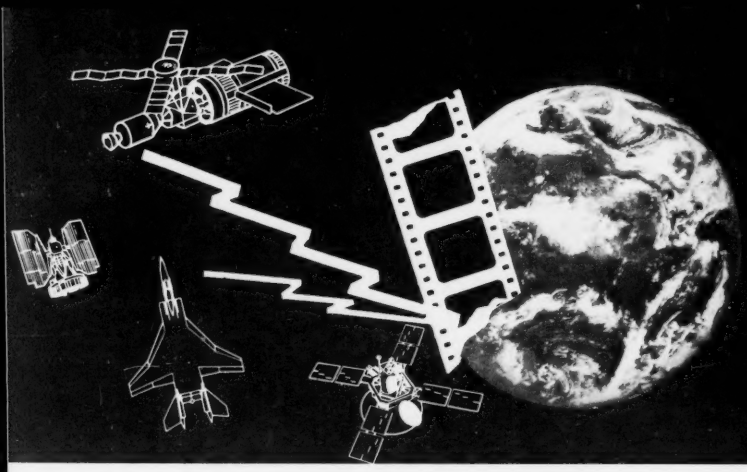

NASA ACTIVITIES

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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MONTHLY NASA HIGHLIGHTS

ROCKWELL AWARDED SUPPLEMENTAL SPACE SHUTTLE CONTRACT

The Space Division of Rockwell International Corp., Downey, CA, has been awarded a supplemental contract totaling approximately $483 million for additional work and a contract extension of 11 months for the development of the Space Shuttle Orbiter and integration of all elements of the Space Shuttle system. The new supplemental agreement extends the incrementally-funded contract through June 30, 1975, and increases its estimated value, including fixed fee, to $943,248,000. A second increment of work, the balance of design, development, test and evaluation, plus delivery of two Orbiter vehicles, which is included as an option, is scheduled to begin July 1, 1975. More than 50 per cent of the dollar value of the contract is to be subcontracted by Rockwell.

ASTP ACTIVITIES

Joint Apollo-Soyuz Test Project flight crew training, which was conducted at Star City near Moscow from June 24 through July 12, involved familiarization with the Soyuz attitude and motion control system, photography and movie equipment, and simulator and mock-up; simulation training in the Soyuz simulator and mock-up, docking simulator, and the communications and television facility; and training in physical fitness, language, and communications. Working Group 1, which is responsible for the ASTP flight plan, mission operation plan, inter-control center communications system, and experiments, will meet in Moscow on August 26 to

COVER

Dean Francis B. Sayre reads a special service from the pulpit under a starburst of light during the recent dedication of a space window at the Washington Cathedral.

undertake on-board documentation. The Project Technical Directors, joined by all five Working Groups, will meet in Moscow for two weeks beginning Sept. 9. Flight controller training will start in Moscow Sept. 15.

GERMANY'S AEROS-B LAUNCHED

The Aeros-B, a West German scientific satellite to measure the main aeronomic parameters of the upper atmosphere and the solar ultraviolet radiation in the wavelength band of main absorption, was successfully launched by a Scout vehicle from the Western Test Range on July 16. The spacecraft, which is the fourth in a series of missions conducted by Germany and NASA, was launched by NASA on a reimbursable basis, whereas previous missions were conducted on a cooperative basis. The satellite, which carries a Neutral Atmosphere Temperature Experiment provided by Goddard Space Flight Center on a cooperative basis, is performing satisfactorily without having encountered any problems. Its operations are being initiated on the planned schedule by the Germans.

ATS-6 EARLY SUCCESS

The successful performance of ATS-6 since its May 30 launch has been demonstrated by the receipt of television transmission with better than studio quality by the Health/Education Telecommunications (HET) small ground terminals and the Satellite Instructional Television Experiment (SITE) terminal at Goddard Space Flight Center. With the aid of ATS-6, courses have already been telecast to junior and senior high school students in Appalachia and medical information has been transmitted to a Veterans Administration hospital at Salem, VA.

GATE OBSERVATIONS

The first phase of the Global Atmospheric Research Program Atlantic Tropical Experiment (GATE), which commenced on June 26, ended on July 16. NASA's ship VANGUARD remained in the small intensive observation area 600 miles seaward of Dakar, Senegal, completing intercomparison observations of upper winds with the NOAA ship OCEANOGRAPHER. VANGUARD's wind observations have been considered excellent, and plans are being formulated to maintain VANGUARD in the same area during the remaining phases. The Ames Corvair 990 aircraft flew nine missions, partly for convective cloud investigations and partly for performing radiation experiments. On one occasion, the Nimbus-5 overpass was compared with data taken from the aircraft's Vertical Temperature Profile Radiometer. The Synchronous Meteorological Satellite (SMS-1) cloud images are proving to be invaluable as a planning tool. There were several operations during which the aircraft and ships encountered ideal weather systems containing very active cumulus activity. GATE Observation Phase II commences July 28 and ends August 17.

NEW STUDIES MARK ERTS SECOND ANNIVERSARY

Although NASA's first Earth Resources Technology Satellite (ERTS-1), launched two years ago last month, was designed to last only one year, it began its third year in orbit still sending back space images of the Earth. As ERTS-1 approached its second anniversary on July 23, plans for using space satellite pictures in a broad range of new studies of Earth's natural resources and man's use of them were announced. New analytical studies of remotely-sensed data from ERTS-1, and subsequently from ERTS-B, which is expected to be launched early next year, will be undertaken by investigators in the United States, in 31 foreign countries, and by four international organizations. While NASA will fund the domestic investigators at a cost of approximately $5.9 million, all of the foreign investigators will be supported by sources in their own countries. The new studies, called ERTS Follow-on Investigations, replace or extend approximately 200 domestic and 100 foreign investigations conducted with data from ERTS-1. During the last two years, ERTS-1 has returned some 100,000 pictures, including imagery with less than 30 per cent cloud cover of all the United States and three-fourths of the world's land masses and coastal areas.

PATENT LICENSING CONFERENCE

The Patent Licensing Conference held in Chicago on July 25 was another in a series of conferences organized by the University of Indiana's Aerospace Research Applications Center under a continuing NASA program to encourage the transfer of space technology to non-aerospace industry. Business firms are being

acquainted with the Agency's liberalized patent licensing procedures and the means for obtaining licensing rights to technology with commercial potential.

NASA EQUAL OPPORTUNITY PROGRAM ADVANCES

Alfonso J. Ludi has joined the office of the Assistant Administrator for Equal Opportunity Programs as Coordinator for Spanish-Speaking Programs. Ludi, who has 11 years' Federal personnel management experience, will be primarily responsible for assuring that Spanish-Americans have the same opportunity as their fellow Americans for employment and advancement in NASA. Specifically, he will advise NASA managers and the Assistant Administrator for Equal Opportunity Programs on the employment concerns of Spanish-speaking citizens and necessary actions required to effectively accomplish the goals of the Spanish-Speaking Program.

The Marshall Space Flight Center recently awarded research grants to several universities under NASA's Developing Institutions Program, which provides enhanced opportunities in research and development for educational institutions with predominantly minority enrollments. Mississippi Valley State College at Itta Bena, MS, was given a grant for the development of a method of monitoring the water quality of rivers and streams. The work will be done on site at the National Space Technology Laboratories in Bay St. Louis, MS. Alabama A&M University at Huntsville, AL, was the recipient of a one-year grant for research on a new method of identifying and measuring the energies of the atomic particles in cosmic rays which might be encountered in long space flights. Another one-year grant to Paine College in Augusta, GA, provided for a study of materials for processing in space, leading to the compilation of a handbook of materials considered feasible for future space experiments involving crystal growth in a low gravity environment.

Eight officials, representing the Field Centers as well as Headquarters, attended the recent convention of the National Association for the Advancement of Colored People (NAACP) in New Orleans, answering questions about the space program and calling attention to opportunities available to minority group members for participation in the agency's activities. Plans already are being made for NASA's active participation in the Association's 1975 convention to be held in Washington, DC.

MEDICAL APPLICATION OF NASA TECHNOLOGY

After about a year's successful use at two Birmingham hospitals, a digital computing cardiotachometer, developed originally by engineers at the Marshall Process Engineering Laboratory to monitor instantaneously the pulse rates of astronauts performing underwater training activities, is now being used in routine physical examinations given to personnel at the MSFC employee medical facility. The device was designed to operate in conjunction with a standard electro-cardiographic unit and employs an electronic digital system which uses the time between two consecutive heart beats to calculate a patient's pulse rate in beats per minute.

NASA/DOT STUDY SEEKS AUTO FUEL SAVINGS

Under a NASA/Department of Transportation agreement, the Jet Propulsion Laboratory is undertaking a six-month study aimed at possible fuel savings through improved automotive aerodynamics. Using three automobiles, representing the most popular standard, compact, and subcompact cars based on 1974 sales volume, the reduction in aerodynamic drag which can be achieved by add-on devices or minor design changes in today's automobiles will be validated experimentally.

APOLLO 11 ANNIVERSARY OBSERVANCES

THE WHITE HOUSE

By the President of the United States of America

A PROCLAMATION

Just five years ago, two Americans thrilled the world when they took man's first steps on the Moon.

The heavens have intrigued and mystified man for all of recorded history. In that single journey five years ago, man's knowledge of our universe, diligently gathered over the centuries, resulted in a spectacular leap away from the Earth.

That leap was more than a tribute to man: it was also a tribute to America, for it would never have been possible without a concerted, cooperative effort joining government, industry and science.

It is entirely fitting that we should commemorate the beginning of man's journey into his universe on the anniversary of that first landing on the Moon by the men of Apollo 11.

Now, therefore, I, Richard Nixon, President of the United States of America, do hereby proclaim the period July 16 through July 24, 1974, as United States Space Week and urge the people of the nation to mark this period in ways that express their pride in the leading role our nation has played in the exploration and use of space which can contribute so greatly to a better land and a better world.

In witness whereof, I have hereunto set my hand this 13th day of July, in the year of our Lord 1974, and of the independence of the United States of America the 169th.

Organized and led by the National Aeronautics and Space Administration and supported by our citizens, the Apollo Program showed what America can do when our people agree on a goal and follow through to achieve it.

The knowledge to be gained from space will lead to scientific, technological, medical and industrial advances which cannot be fully perceived today. In time man may take for granted in the heavens such wonders as we cannot imagine—just as superhighways across America would amaze the Puritans of 1620 or transatlantic flights would astound those who passed on the legend of Icarus. But we know that a beginning has been made that will affect the course of human life forever.

LAUNCH COMPLEX 39 AT KSC MADE NATIONAL LANDMARK

Dr. Low Is Principal Speaker at Ceremonies Commemorating Apollo 11 Blastoff

Launch Pad 39A, site from which the Apollo 11 mission to the Moon began, was given a permanent, recorded niche in history in ceremonies commemorating the fifth anniversary of the liftoff at the Kennedy Space Center July 16.

Present to take part in the program were the three members of the Apollo 11 crew—Neil A. Armstrong, Michael Collins and Edwin E. (Buzz) Aldrin, Jr. So also were Dr. George M. Low, Deputy Administrator of NASA and the principal speaker for the occasion, and Dr. Kurt H. Debus, KSC Director and the master of ceremonies.

As the highlight of the program, the astronauts unveiled a plaque that officially designated the site in the Register of Historic Places as a National Historic Landmark.

"In the years to come," Dr. Low told the thousands of persons who attended, "people from all nations and all walks of life no doubt will visit this site. Some will be awed by the tons of steel and concrete they see, while others will attempt to recreate in their minds the sight and sound that marked Apollo 11's flight into the heavens. Still others will pay silent tribute to the three men who dared the unknown. A few, I imagine, will shake their heads in wonderment and remark to themselves, 'So this is where it all began!' "

Among distinguished guests attending were Congressman Olin E. Teague, Chairman of the House Committee on Science and Astronauts, and former NASA Administrator James E. Webb. Each spoke briefly.

Later in his address, Dr. Low said in discussing the space program:

"Apollo is the symbol of hope for the future of mankind. The symbol of hope for the future, because it is a demonstration that mankind can cope to achieve what at first appeared to be impossible.

"Apollo was in the forefront of the thrust for a new and better world, and so is NASA today. Unlike many of our sister agencies of Government which deal with the everyday duties of society, NASA is pushing beyond the frontiers of science

A HISTORIC MOMENT—Apollo 11 astronauts, left to right, Armstrong, Aldrin and Collins, unveil plaque at Kennedy Space Center.

and technology, and we do this peacefully, openly, and for the benefit of all. True, our major thrust is the exploration of space. We have put men on the Moon and spaceships around Mars. We have extended our reach to Venus and Mercury, and glimpsed the mysteries of the distant world of Jupiter.

Own Planet Enhanced

"The same technology that made these feats possible has enhanced measurably the quality and security of life on our own planet: weather satellites warn us of storms; communication satellites have pushed back the barriers of ignorance; resource monitoring spaceships watch our farmlands, help us to locate vital minerals, and keep a watchful eye on the advances of pollution. Many of the discoveries and innovations our efforts produced have found their way into medicine, electronics, and products and services of all kinds. The views brought back by astronauts of our tiny planet, floating like a blue oasis in the void, have stirred our spiritual belief while making us aware of our cosmic heritage. And if the coming joint space venture with our Russian neighbors can be counted, we can lay firm claim to the easing of world tensions.

"No matter our achievements, however, we cannot relax our pursuit of knowledge, for we must now face the coming crises of our times. Every effort must be made to see that the opportunity which our technology presents is not lost. We may be sure that the opportunity will not occur soon again, if ever. To fail now would mean a ravaged environment and depleted resources—a plunge into a new and terrible Dark Age from which there would be no return. We must refind, adapt, use and experiment with new sources of knowledge. In our pursuits we must push ahead in every area: in theoretical fields, which are now so remote from application that no one can see any connection; in fields so abstruse they cannot be successfully explained to the layman. For unless we continuously restore the fund of basic knowledge, we shall ultimately exhaust it.

"This perspective has not been lost by the men and women of NASA. With the help of American industry and universities, we are moving towards new and even more exciting adventures in space; adventures that will ultimately have practical application.

"Ahead lies the Viking landing on Mars. Within a few years, Shuttle orbiters will add a new dimension to Earth studies by ferrying teams of sci-

entists and engineers to and from space on a regular basis. Beyond lies the construction of huge orbiting space stations with men and women scientists of all nations working together in harmony for a common purpose. They will investigate the Earth, the Sun, the stars, the universe; they will experiment with applications of weightlessness to medicine and manufacturing processes. Some day we will establish scientific outposts on the Moon, and even tap its mineral resources. And in the not-too-distant future astronauts may tread the surface of Mars and the glaciers of the moons of Jupiter in search of extraterrestrial life.

"It is not inconceivable, also, that one day we may even be able to listen to other civilizations in the distant reaches of our galaxy—to tap our cosmic heritage just as we have tapped the wisdom and the experience of the earliest civilizations of Earth.

"In the final analysis, the ability to move outward in space, to colonize other worlds in our solar system and to communicate with other intelligent beings, may represent the fundamental factor in the survival of our species.

"The future began here at 9:32 a.m. on July 16, 1969. At that moment on July 16 in the year 2069, launch windows to Mars, Neptune, and Pluto will be open. Will we fly through those windows? I think we will."

SMITHSONIAN PLAYS HOST ON LANDING ANNIVERSARY

Top NASA Officials and Apollo 11 Astronauts Take Part in Commemorative Program

During a bright sunny afternoon on July 20, ceremonies marking the fifth anniversary of the first manned lunar landing took place on the Mall across from the new National Air and Space Museum scheduled to be opened on July 4, 1976, as a part of the Smithsonian Institution.

Host for the occasion was the Smithsonian. Its Under Secretary, Robert A. Brooks, who presided, told the large crowd in attendance of the museum's supporting role in all scientific exploration, in air and in space, since it was founded.

He was one of several speakers who took part in the program. Others included Dr. Thomas O. Paine, Administrator of NASA at the time of the Moon landing; Dr. James C. Fletcher, present Administrator; Dr. George M. Low, Deputy Administrator; and the three Apollo 11 astronauts, Neil A. Armstrong, Michael Collins and Edwin E. Aldrin, Jr.

In his opening remarks, Under Secretary Brooks recalled that the first Secretary of the Smithsonian, Joseph Henry, leading American physicist of his day, encouraged one of America's

SCENES AT SMITHSONIAN—In the photo on the left, Dr. James C. Fletcher (left), NASA Administrator, and Dr. Thomas O. Paine (right), former NASA Administrator, are pictured as they sat on the guest platform at the Smithsonian gathering. In the second row are two of the Apollo 11 crew members, Edwin E. Aldrin, Jr., (left) and Neil A. Armstrong. Mrs. George M. Low, wife of the NASA Deputy Administrator, is in the back row. The photo at right shows Armstrong as he addressed the assembly.

earliest balloonists, Thaddeus Lowe, in his remarkable series of flights which included an ascent from the Smithsonian grounds in an effort to persuade President Lincoln of the value of balloons for military reconnaissance.

He said that the Smithsonian's devotion to science has ranged from the last great exploration on American soil, Major John Wesley Powell's 1869 passage of the Grand Canyon of the Colorado River, all the way to the explorations of air and space.

"In fact," he said, "the Smithsonian's association with aeronautics dates from the aerodynamic studies of its third secretary, Samuel Pierpont Langley (for whom NASA's Langley Research Center is named), which culminated in 1896 in the successful flight of an aircraft for more than half a mile along the Potomac River. As word of this unheard-of feat circulated around the world, the Smithsonian received a request for information about aeronautics from a young bicycle maker in Dayton, Ohio, whose name was Wilbur Wright.

"Among Langley's pioneering efforts, perhaps one of the most significant was his establishment of the Smithsonian Astrophysical Observatory, which in addition to its other space research activities has provided tracking facilities for American space flights, analyzed lunar sample material returned to Earth by the Apollo missions, and is now preparing an experiment to measure gravitational variations which will be carried out during the joint U.S.-USSR Apollo-Soyuz Test Project next year."

Association with Goddard

Even closer to the Moon landing anniversary, he reminded, was Smithsonian's association with Robert Goddard and the Institution's support of his efforts to build a rocket that would reach extreme altitudes.

"In the light of the Smithsonian's historical concern with the increase and diffusion of knowledge," the Under Secretary said, "how should we regard the Apollo 11 mission in the perspective of the five years since 1969? It seems to me that the astronauts themselves gave us the answer once before when they said, 'We stood on the shoulders of giants.' Seldom has there been a more dramatic demonstration of the fact that progress in human affairs does not spring full-blown from the efforts of one man or group of men. What we saw on July 20, 1969, was the culmination of the efforts of hundreds of scientists and engineers from Leonardo da Vinci and Galileo to the Wright brothers and Lindbergh, from Joseph Henry and Samuel Pierpont Langley to the Apollo 11 astronauts. Each built on what his predecessors had accomplished until the accumulation of knowledge made possible the kind of quantum leap forward represented by the Apollo Program."

Dr. Paine, the first speaker introduced by Under Secretary Brooks, said in discussing the Apollo Program that "one must pay tribute here to the administrative genius of Jim Webb (James E. Webb, who preceded him as Administrator), "whose understanding grasp of space-age management built the remarkable capability in management which was responsible greatly for NASA's achievements."

But the fundamental significance of Apollo, he said, was that "for the first time mankind has been given a vision of the thin biosphere that surrounds our beautiful blue planet, Earth, which, as we now know, is the fragile home of all the life that so far has been detected in our solar system. And for the first time, terrestrial life that evolved here on this planet over billions of years has reached out to touch another world.

"To me, this is the true significance of Apollo. The human intellect triumphing over time and space has pioneered a route in our generation by which terrestrial life will surely in centuries to come enliven other worlds."

Dr. Low Next Speaker

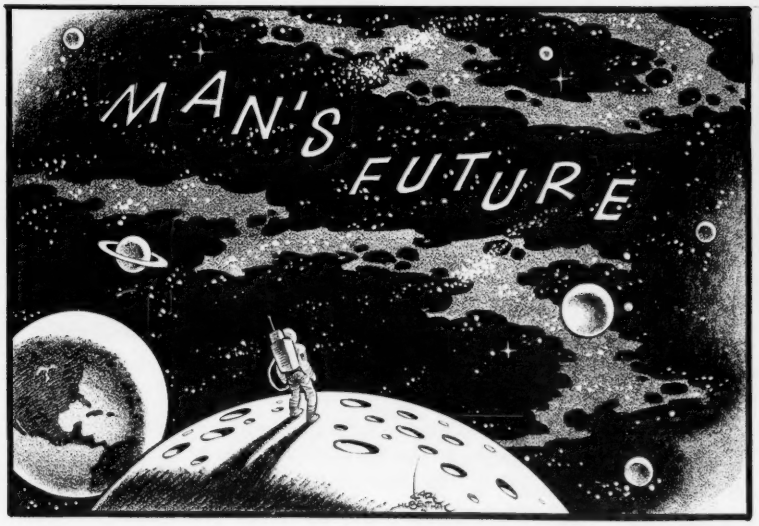
Dr. Low, the next speaker, referred to Apollo as "the symbol of hope for the future of mankind" despite the . . . "serious problems—super problems having to do with the environment and natural resources and energy" facing man on Earth.

"I can say this," he said, "because the men and women of Apollo demonstrated that mankind can hope to achieve what at first appears to be impossible—that we can solve tomorrow's super problems—that we can succeed in spite of what may appear to be insurmountable obstacles."

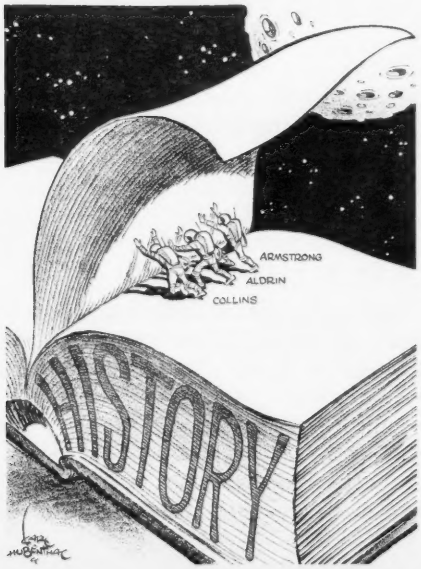
In discussing the past glory of Apollo, he called attention to the importance of NASA programs that lie ahead.

"No matter our achievements," he stressed, "we must now look to the future. With the help of American industry and universities, we are moving towards new and even more exciting adventures in space; adventures that will ultimately have practical application.

"Ahead lies the Viking landing on Mars. Within



Editor's Note: **In looking back over NASA's collection of editorial cartoons inspired by the Apollo 11 mission five years ago, we were particularly impressed by the way Karl Hubenthal of the *Los Angeles Herald-Examiner* caught the mood of the American people at that time and how he interpreted the significance of the first lunar landing. Three samples of his coverage of Apollo 11 are reproduced here.**



a few years, Shuttle orbiters will add a new dimension to earth studies by ferrying teams of scientists and engineers to and from space on a regular basis. Beyond lies the construction of huge orbiting space stations with men and women scientists of all nations working together in harmony for a common purpose. They will investigate the Earth, the Sun, the stars, the universe; they will experiment with applications of weightlessness to medicine and manufacturing processes. Some day we will establish scientific outposts on the Moon, and even tap its mineral resources. And in the not too distant future, astronauts may tread the surface of Mars and the glaciers of the moons of Jupiter in search of extraterrestrial life.

"It is not inconceivable, also, that one day we may even be able to listen to other civilizations in the distant reaches of our galaxy—to tap our cosmic heritage just as we have tapped the wisdom and the experience of the earliest civilization of Earth.

"In the final analysis, the ability to move outward in space, to colonize other worlds in our solar system and to communicate with other intellectual beings, may represent the fundamental factor in the survival of our species."

Dr. Fletcher Evaluates Apollo

Dr. Fletcher, who spoke next, said that Apollo "clearly overshadows and stands out as the most memorable event of our era." When the Eagle landed on the Moon, he added, man burst the bonds that for millions of years tied him to the small and fragile planet Earth.

"There is little likelihood," he continued, "that the epic accomplishments of Apollo will be lost in the pages of history. There is, however, a very real danger that our own generation may too soon forget that progress has a price which society must be willing to pay.

"Today, for example, we face a number of crises: energy, pollution, urban congestion, crime, inflation and so on. All of these problems affect us in very direct, immediate, and personal ways and properly rank high on our list of priorities.

"But in establishing national priorities, we must be mindful that, no matter how pressing the demands or acute the crises of its time, every progressive society to remain strong must commit a portion of its resources for programs to advance human knowledge and progress.

No Immediate Payout

"Universities, research programs, scientific investigations, all require a commitment that at the time seems difficult to support, when weighed against the needs of the day. And in every age there have been critics of programs that have no immediate payout, or do not address directly the immediate and urgent problems of the time.

"The space program is such a program. The dollars we spend on space research and exploration produce no instant supply of food for the hungry, no shelter for the homeless, no clothing for the ragged. Spinoffs from space technology have helped in innumerable ways to improve everyday life for thousands of people, but NASA programs provide no quick, ready-made solution to the major ills that afflict mankind. Yet in the long run, the benefits of our programs may return many times over the cost of the initial investment. In fact, when our descendants look back on it, the first manned landing on the Moon most certainly will be considered the outstanding event of the 20th Century and probably more. July 20, 1969, may be remembered in the future as the day man ended an era of one-planet civilization and began a new age as traveler and colonizer of the Universe.

"In times past, decisions to embark on great undertakings were made *for* people by royalty or their religious leaders. It is still the responsibility of leaders to lead, to point the way. But in a democratic society, the final decision rests ultimately with the people themselves. They must voluntarily choose to make the sacrifices needed to assure progress. This choice was made by our Republic year after year until that day was reached five years ago and men, our men, made the first steps off our planet and into the solar system.

"Most Americans continue to have a strong commitment to the future and are willing to spend a portion of this country's bountiful resources on a better tomorrow for all the world's people. Despite current difficulties and gloomy prophecies by well-meaning but short-sighted critics, our nation and the rest of human kind will make more of these steps into the vast but exciting reaches of our solar system."

ARMSTRONG PRESENTS MOON ROCK TO WASHINGTON CATHEDRAL

Special Service Is Held to Dedicate Window in Which It Will Be Embedded

Religion and space were blended into a melody of solemn thoughts at a church service to dedicate a window at the Washington Cathedral in which is to be preserved a rock from the Moon. During the period of sacred observance, prayer and solemn music composed the background.

Held the day following the fifth anniversary of the Moon landing, the service was one of commemoration and thanksgiving. Seated in the congregation were the three Apollo 11 astronauts who brought back the rock from the lunar surface—Neil A. Armstrong, Michael Collins and Edwin E. Aldrin, Jr.

Also present were Dr. Thomas O. Paine, NASA Administrator at the time of the landing, who donated the space window to the Cathedral, and Dr. James C. Fletcher, present Administrator. Each read a Lesson during the service.

The rock was presented by Armstrong to the Very Reverend Francis B. Sayre, Jr., Dean of the Cathedral, who delivered a special address on the spiritual significance and religious implications of the Moon landing.

The window, designed by Rodney Winfield of St. Louis, MO, depicts in stained glass swirling stars and orbiting planets. The rock will be embedded in it 33 feet above the floor of the Cathedral, recognized as a national landmark and tourist attraction.

Dean Sayre's address follows:

1—Liftoff

"Let us go over to the other side." Such was the bidding of Christ to his disciples upon the shore of the Galilee Lake. "And they launched forth upon the deep."

So simple, so unerringly does the Bible portray that primordial urge in Man that requires him to trace out with his stubby finger the wondrous shape of Creation. Never may the human spirit be content to sit by the lake; Man must up, to follow his Maker across the deeps, questing after those invisible things that God has given him to find, that have to do with who he is, and what he is meant to be, and the holiness that is in all things.

A WINDOW BLESSED—Dean Sayre of the Washington Cathedral is shown as he blessed the space window in the background.

Never mind the storms; never count the cost; reckon not the doubt, nor the fear: For it is writ upon the code of his genes that Abraham should journey to the unknown land which God would show to him; that Jacob upon his pilgrimage should dream of angels connecting his faltering step to the mighty tread of Eternity; that Vikings should sail the Northern seas; and Polynesians discover the Southern isles; that patient minds should insatiably probe the marvellous texture of connection, the infinite skein of facts that are woven into the miracle that surrounds us.

Not upon this planet until the present generation has this heaven-bred curiosity broken through the terrestrial envelope that hitherto condemned us to the perspective of a fish at the bottom of its bowl. Our praise of God this day is thanksgiving for that immense act of courage which at last succeeded in breaching the chrysalis, and sending us on wings of daring to the first stepping-stone of Universe, where five years ago members of our race made the first human footprint upon the Moon.

The sun that lit their faces on that day, and the stark landscape around them, was also the brightness of a new day for mankind; he had climbed another rung on the ladder of heaven.

II—Sojourn Beyond Earth

'Twas not men Jacob saw upon the ladder, but angels passing up and down, linking God to Man. To tiny Earthlings, clasped in their small horizon, it might have seemed as if it had been Man who climbed so high. But to the three now thrust so far from familiar atmosphere, the Psalmist's words pierced to very truth: "What is Man, that Thou art mindful of him?" For, oh the loneliness that pervades the infinite silence of Space! How infinitesimal is the little breath of life; how impotent the strength of Man in the orbit of the spheres!

Think of Mike Collins, disappearing totally alone to the far side of the Moon; his hope of ever seeing Earth again dependent utterly upon those long chains of calculation by which we encode the knowledge we accumulate and the safety we predict.

Remember Buzz Aldrin calling for a moment of silence in the interplanetary chatter so that all who watched that night might be still and know that 'tis *God* who sustains, tho a man "take the wings of the morning" and "climb up into heaven," as the Psalmist says. Quietly he poured the wine of that humble communion into the little chalice he had brought for the purpose. So was blessed the first foot-fall of mankind beyond the orb of his birth.

And in the mind of the commander, Neil Armstrong, what solitude of responsibility lent poignancy to his unspoken prayer! It's *God* who gives grace to withstand the limitless capacity of disaster; 'tis He who guards the minutes and the hours and the days of hope. *His* angels keep the spirit warm, even as one strives with all one's might to fend off fear and make no mistake whatsoever.

Thus must it have been, five years ago, when these three men who are the emblem of all mankind ventured one-quarter of a million miles into the nearer borders of God's unbounded majesty, and there beheld across the barren vacancy of the lunar waste the lovely blue and tan and white of rising Earth, shining in the sun.

Then did one of those men stoop down and pick up a rock. God's might; God's mercy; it was a sign of both. These are the same men who come now to offer at His altar that stone; in praise and thanksgiving to the everlasting glory of that Creator God.

III—Splash Down

Many, many years ago, a man named Zacharias (he happened to be the father of John the Baptist) marvelled at God's mercy, when Jesus was born. "The dayspring from on high hath visited us," he sang, "to give light to them that sit in darkness, and in the shadow of death, and to guide our feet into the way of peace." (Luke I:78-79)

When the astronauts of Apollo 11, and the brave men who followed on succeeding missions to the Moon, brought back some chunks of lunar material, it was not just bits of rock they returned to Earth, but, in an exciting way, the very horizon of eternity!

Anyone who sees one of those stones, as will pilgrims to this cathedral in all time to come, see the ancient piece of moon embedded in the window we dedicate today, cannot but sense something of the awe those Christmas shepherds felt when they saw what they took to be the effulgence of Heaven, hovering over the field where they lay.

For there, in that tiny piece of stone, is writ, all unweathered and unworn, the history of the origins of everything, including us. Billions of years: recorded and decipherable for us to read!

But yet much more: for these rocks are only the first little doors to mansions infinitely wider still. Beyond the Moon: the planets next and beyond the solar system—what after that?

How the mother thrills at her child's first step, for it bears the promise of a lifetime to follow, and the freedom of walking wherever the child may choose to go.

Blessed little rock, then—first piece to fall in place, in the vast puzzle God has given us to put together—infinite odyssey of the future. Here will be enshrined, in the beautiful window Rodney Winfield has made for it, the prospect of that destiny, like the little shoes of a child, cast in bronze, on the living room table.

Zacharias knew, as indeed it is the instinct of all men to know, the most important thing of all:

that when the Dayspring from on high stoops to visit us, He brings a message, and the grace of healing. "Light to the darkness; peace to our wayward feet," were the prophet's words.

Here, surely, is the deepest meaning of our commemoration today. Each one of these men who have soared beyond the clutch of earthly atmosphere has tried in his own special way to express the overwhelming revelation of the oneness of mankind that came to them as they looked back upon Earth. The fragile miracle of life; spinning blue in the sea of black; precious beyond compare; sacred in its wondrous possibility.

In the immensity of Space they looked with affection upon their homeland; that unique nest of fledgling intelligence, reaching out now if perchance somewhere in the universe there might be other minds to meet.

How trivial, in that great perspective, becomes the little greed of Man, his ugly strife and selfish division. How profligate appears his thoughtless poisoning of the planet; his little fist of pride lifted against the peace and goodness of God!

Let the silver of moon given here be an emblem then, in this house of prayer, of that more wholesome vision which distance lends, an earnest, if it may be, of the judgment of Eternity. The little stone is very old: 3.6 billion years we are told. How old is God who made it all? The little stone is dense; basaltic residue of some fire akin to that of a star. Out of what dark mystery came the first great explosion of Being? But in the black body of this stone which the astronauts have brought are little pinpoints of crystal through which, if one looks very closely, the light can be seen. What blessed light is that: which will be shed upon us, through the substance of the Moon, like a glimpse of the Dayspring from on High? Some incarnation here of Almighty God who is not only Creator, but Redeemer, too.

There is also, in the bit of rock you have seen here today, a new mineral discovered; unknown to Earth. Perhaps God has some fresh new thing to tell us by the courage of these adventurers who brought it to this place. If so, it can only be word of His love, who designs to share with us so much, and one by one to open to our eyes the secrets of His making and to our hearts the treasure of His holiness.

PRESIDENT NIXON RECEIVES SPECIAL PLAQUE FROM NASA

Tablet Bears Names of All Americans Who Have Been in Space

Neil A. Armstrong, first man to put foot on the Moon, flew to the California White House during Space Week to present President Nixon with a special plaque in behalf of all people who have taken part in the space program.

"Mr. President," Armstrong said in making the presentation, "you have proclaimed this week to be United States Space Week in conjunction with the fifth anniversary of our first successful landing on the Moon. It is my privilege to represent my colleagues, the crewman of Projects Mercury, Gemini, Apollo, and Skylab, and the men and women of NASA and the hundreds of thousands of Americans from across the land who contributed so mightily to the success of our efforts in space in presenting this plaque which bears the names of each individual who has had the privilege of representing this country" in a

President Nixon accepts plaque from Neil Armstrong

space flight.

In accepting the plaque, the President spoke as follows:

"Thank you very much, Neil. It is hard to realize that five years ago we had the dinner in Los Angeles honoring the crew of which you were the captain, but in that period of time there have been so many more who have gone to the Moon and who are now participating, of course, in the new projects which will culminate in the joint Soviet-American enterprise in 1975.

"Five years ago, I don't think we would have anticipated that would happen, although I know you expressed at that time, you and your colleagues, the hope that what we were doing in space would be shared with other people throughout the world. And that is exactly what we are doing.

"I think it is also very generous of you, but very appropriate to point out that there are the names of a very few, very courageous and able and intelligent people, including of course yourself, on this plaque. They could not have done what they did without the backing of some 400,000 people who have, at one time or another, been engaged in the space program.

"And so this plaque will represent the efforts of all of those who have made our program possible, who have made the United States first in the exploration of space.

"We will put it in an appropriate place in the White House so that thousands of visitors who come through there will be able to be reminded, particularly in the next week or two weeks, of what we have done in the field of space.

"And finally, I would say this: That there are those who might wonder was it worth it. We are now finding that in terms of even practical application, apart from exploration, that it was worth it.

"As you were telling me just a few moments ago in the office, the areas of geology, of topography, predictions with regard to the weather, and needless to say in communications, all of these have received a tremendous input that they would not have had unless we had had the space program.

"In addition, there is the fallout technologically which cannot be estimated in terms of money; technology, because of the contribution of the space program. But most important, I think the greatest contribution of this program is not exploration and it is not the technology, where we are getting benefits that are material, but it is the spirit that you and your colleagues in the program have had the opportunity to demonstrate to the American people all over the world.

"We are proud of the men who have gone to space, we are very proud of all of those who helped you make it possible to go into space. Without a great challenge you can't be a great person, and we have demonstrated through this program, and we congratulate you again five years later, you and your colleagues, for all that you have done."

NIXON SAYS ASTP IS SYMBOLIC OF NEW RUSSIAN RELATIONSHIP

Assures Steps Used in Planning Joint Mission Could Bring Lasting Peace

A large portion of the remarks President Nixon made by radio and television to the people of the Soviet Union on his recent visit to Moscow concerned the Apollo-Soyuz Test Project and the effect it can have toward bringing about a lasting peace between the two nations.

His statement follows in part:

"As allies in World War II, we fought side by side in the most terrible war in all human history. And together with our allies we won the victory. In winning that victory, the people of the Soviet Union and the people of the United States shared a common hope that we also had won a lasting peace. That hope was frustrated, but now we have a new opportunity.

"Winning victory in war is difficult. It requires extraordinary courage, stamina, and dedication from every individual citizen in the nation. But in some ways, the building of a lasting peace is even more difficult than waging war because it is more complex. We must bring to the task of building that peace the same kind of courage, of stamina, of dedication that inspired us in our struggle for victory in war.

"And the fact that our task of building peace is more complex does not mean that we cannot succeed.

"Let me give a striking example which demonstrates that point. In the whole field of modern technology, no mission is more complex than the mission of sending men into space. The joint Soviet-American space mission planned for next

year—the joint Soyuz-Apollo mission—is in many ways symbolic of the new relationship we are building between our two nations.

ASTP Is Symbolic

"It is symbolic for several reasons—reasons which carry important lessons about that new relationship.

"For one thing, the rocket technology developed for war is being used for peace.

"And for another, Soviet and American spacemen, starting from their separate countries, will find their way toward one another and join with one another—just as we are doing and must continue to do across the whole range of our relationship.

"By standardizing their docking techniques, they will make international rescue missions possible in case future space missions encounter trouble in space; thus they will make space safer for the astronauts and the cosmonauts of both of our countries—just as our new relationship can make life on Earth safer for the people of both of our countries.

"Finally, and perhaps more important, this joint mission—for which our astronauts are now here in the Soviet Union training alongside your cosmonauts—is being made possible by careful planning, by precise engineering, by a process of working and building together, step by step, to reach a goal that we share, and this is the way that together we can build a peace, a peace that will last.

Tolstoy Story Cited

"One of the greatest of your writers, Leo Tolstoy, once told this story. A very old man was planting apple trees. He was asked: 'What are you planting apple trees for? It will be a long time before they bear fruit, and you will not live to eat a single apple.'

"The old man replied, 'I will never eat them, but others will, and they will thank me.'

"Our two nations bear a shared responsibility toward the entire world. And we, too, must plant now so that future generations will reap a harvest of peace—a peace in which our children can live together as brothers and sisters, joining hands across the ocean in friendship, and ushering in a new era in which war is behind us, and in which together, in peace, we can work toward a better life for our people and for all people."

HELIOS WITHSTANDS INTENSE HEAT

Heat equivalent to that of 11 suns has been produced for the first time in a large space simulator at the Jet Propulsion Laboratory.

This was done in tests conducted on a prototype of the Helios-A spacecraft that will be launched in October from Kennedy Space Center to travel to within 28 million miles of the Sun, 10 million miles closer than ever before reached by a man-made object.

During the tests, parts of the spacecraft reached 700 degrees Fahrenheit, or 370 degrees Centigrade. After five days of testing, the German-designed Helios was proclaimed ready to withstand the extreme temperatures it will encounter during its unprecedented journey.

Previous high intensity achieved in the simulator was six and a half suns, accomplished in testing Mariner 10 prior to its successful trip to Mercury this year. Project Managers Ants Kutzer and Gilbert W. Ousley said the JPL facility is the only one capable of running the necessary tests for Helios. Kutzer is associated with the West German Association for Space Exploration, Ousley with Goddard Space Flight Center.

Helios-A will be launched jointly by the United States and West Germany. A second craft, Helios-B, is scheduled for launch late next year.

SOLAR RECORDER DESIGNED

A recorder to evaluate solar energy available in any area of the world where ambient temperatures are between −40 and −125 degrees Fahrenheit has been designed by the IBM Federal Systems Division at Huntsville, AL, under contract to the Marshall Space Flight Center.

The recorder will give engineers enough data to plan and build equipment to convert solar energy into power. The fully automatic device, used in a specific area or distributed throughout the country to record "sunfall" measurements, will store the readings in a centralized location and will record the data in a computer format. It will measure the direct solar radiation, the total (direct plus diffuse) solar radiation, and the solar collector's efficiency.

The recorder also will provide the necessary solar radiation measurements vital to the efficient design and development of converters prior to any large-scale construction.

FSEP PROGRAM AT MSFC

More than 200 high school and college students are employed this summer at Marshall Space Flight Center under the Federal Summer Employment Program (FSEP).

Three different programs are involved under the overall program. One hundred and forty-four high school students are working as summer aides and 30 high school and college students as clerical assistants. In addition, 36 undergraduates are included.

Those students in the summer aide program assist in performing routine office duties. Enrolled in the clerical and undergraduate programs are those who had passed the civil service tests and been selected from federal job registers for placement at MSFC. The undergraduate program is designed to strengthen a student's future professional skill by placing him in an area related to his major field of study.

Each student in the summer program, scheduled to end Sept. 30, is provided with training sessions and a counselor to assist him in adjusting to MSFC's work environment.

X-RAY TELESCOPE UNDERWAY

An X-ray telescope to be aimed at a distant supernova remnant after launch by a British Skylark sounding rocket is being assembled at Marshall Space Flight Center.

The rocket, Skylark SL 1115, is scheduled for launch in June of 1975 from the Woomera Rocket Range in Australia.

The project, to be carried out jointly by the U.S. and Britain, will seek new information regarding the nature of Puppis, a supernova remnant. MSFC will conduct NASA's portion of the undertaking, which involves the design, fabrication and assembly of the flight telescope. The British will integrate the payload into the rocket and provide the detector, launch facilities and operations.

Principal investigators in the project are Richard B. Hoover of MSFC's Space Sciences Laboratory and Dr. Iah Tuohy of the Mullard Space Science Laboratory in the United Kingdom.

The Skylark is a two-stage rocket. The booster firing time is five seconds, while the second stage fires for 30 seconds. Acquisition of target is expected at three minutes and 12 seconds after launch. The apogee will be reached at four minutes and 19 seconds into the mission at a height of 275 kilometers (171 miles).

SCHNEIDER APPOINTED DEPUTY

William C. Schneider, former Director of the Skylab Program, has been appointed Deputy Associate Administrator for Manned Space Flight at NASA Headquarters and will report to the Associate Administrator for Manned Space Flight, John F. Yardley.

Immediately prior to his appointment and since winding up the Skylab Program in early 1974, Schneider had served as both Acting Associate Administrator and Acting Deputy Associate Administrator for Manned Space Flight.

Before coming to NASA in 1963 from IT&T's Federal Laboratories, he had worked for the U.S. Navy and the National Advisory Committee on Aeronautics, NASA's predecessor agency.

Several state agencies and departments in Texas are planning the use of satellite-generated information in an attempt to better monitor and manage that state's vast natural resources.

LOW COST DIRECTOR NAMED

George Muinch has been appointed Director of NASA's Low Cost Systems Office, succeeding Adelbert C. Tischler, who has retired.

The new Director has had an extensive career in research, development, engineering and production in the commercial and aerospace industries.

George Muinch

The Low Cost Systems Office, established last year, has been conducting studies of factors affecting costs of space programs, and, based on these studies, has implemented standard equipment programs to reduce the cost of space missions. It also identifies and evaluates specific business and program practices to achieve changes designed to reduce the costs of NASA programs.

A native of Indiana, Muinch holds a Bachelor of Science degree in physics from the University of Notre Dame and a Master of Science degree in physics from the University of California. He has worked successively with the Hughes Aircraft Co., Lockheed Missile Division, Aeronutronic Systems, Inc., Northrop Corp., Dynascience Corp., and the Computer Measurements Corp., in the last of which he was a partner.

LOW COST CORNER

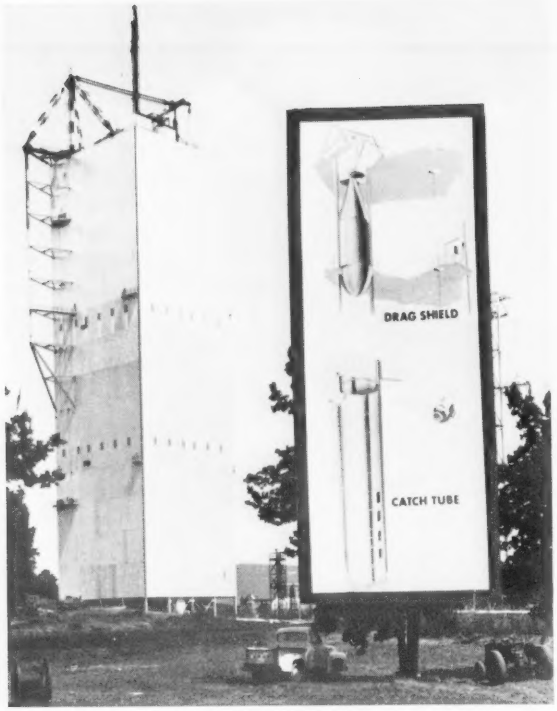
"MIGHTY" LOW COST, SAYS:

"USING PROVEN OFF THE SHELF HARDWARE, SAVES TIME AND MONEY!"

"The MVM'73 spacecraft is the sixth of a series of planetary spacecraft which began with Mariner Venus 1962 and included Mariner Mars 1964, Mariner Venus 1967, Mariner Mars 1969, and Mariner Mars Orbiter 1971. All of these spacecraft share common features which are derivatives of Mariner Venus 1962 concepts."

"The MVM'73 benefited not only from design derivation but also from residual hardware from past Mariner programs. The Project Manager emphasized the maximum use of existing design, existing hardware and software. Division representatives, contractors as well as the project staff were indoctrinated to review thoroughly the existent capabilities before instituting new design activity. The payoff from this policy was great—saving perhaps 50% of necessary design and development and perhaps 15% of required hardware."

The above is a direct quote from *Mariner Venus/Mercury 1973, a Study in Cost Control*—a report you should read. For more information contact the Low Cost Systems Office, 202 755-8825.



Test Stand at MSFC

TEST STAND STILL USED

A large capsule dropped along guide rails inside the structure of a Saturn V test stand and boosted into a speed in excess of free fall is saving money and time by providing brief weightless periods for materials processing and other experiments at Marshall Space Flight Center.

From April, 1970, to the end of May, 1974, 30 drops were performed, ranging from material processing experiments to cloud physics investigations. The 430-foot-tall building was originally constructed as a Saturn V Dynamic Test Stand. The total drop facility height inside the building is 334 feet, with a free fall height of 294 feet.

Vaughn H. Yost, Technical Manager for Material Processing Drop Testing at MSFC, says studies have shown that the facility provides many advantages over other methods of zero-g testing, one of which is the lowest cost.

The capsule is 24 feet long and seven feet in diameter. With the 450-pound experiment test package on its floor, the capsule weighs nearly 4,000 pounds. Air thrusters are turned on when the capsule is released, speeding it toward the ground faster than free fall. As a result, the experiment package loses contact with the floor of the capsule for up to 4.2 seconds.

RESEARCHER NEARS TENURE END

Dr. Roderick B. Davidson, National Research Council associateship recipient, will soon complete his 21-month tenure as a research associate in the Solid State Sciences Branch, Space Sciences Laboratory, at Marshall Space Flight Center.

Dr. Davidson's research at MSFC has involved methods for growing single crystals of organized materials with a small amount of metal ions uniformly distributed throughout the crystal. This type of research is calculated to produce new materials for technological developments and to further man's knowledge in crystal growth and solid state physics, according to Davidson.

A native of Walker County, AL, he is a graduate of Walker County High School and received his Bachelor of Science degree in 1966 and Doctor of Philosophy degree in 1970, both in physics, from the University of Alabama.

LLOYD JONES NAMED DEPUTY

J. Lloyd Jones, formerly Director of the Aerodynamics and Vehicle Systems Division, has been appointed Deputy Associate Administrator for Aeronautics Technology in the Office of Aeronautics and Space Technology at Headquarters.

J. Lloyd Jones

His new responsibilities include aeronautical operating systems, military aircraft programs, transport technology, aeronautical man-vehicle technology, aeronautical propulsion, aerodynamics and vehicle systems, and the JT&D Refan Program.

He has been succeeded in his former position, to which he was appointed in 1972, by James J. Kramer.

From 1970 to 1972, Jones served as Research Assistant to the Director of Ames Research Center. Prior to that he was successively Chief of the 8-by-7-foot Supersonic Wind Tunnel Branch, Chief of the Vehicle Aerodynamics Branch and Chief of the Aeronautics Division.

TAKING A LOOK AT SPACE—Visitors stop to examine the space exhibits as they pass through the U.S. Pavilion at Expo '74.

EXPO '74 FEATURES SPACE

Visitors to Expo '74 at Spokane, WA, are afforded ample opportunity to learn about NASA. An average of 35,000 persons go there daily, a good proportion of whom wind up in front of the space program exhibits.

In the International Pavilion, in conjunction with the Environmental Symposium Series, the ERTS exhibit, "Rediscovering Earth," and the ERTS mosaics of the U.S. and Alaska are principal attractions. A sound show on Earth resources, "Monitoring From Space," is reported to be playing to steady audiences from opening to closing time daily.

Also in the U.S. Pavilion, especially appropriate for the July 4 observance and the fifth anniversary of the Moon landing, are a full-scale Lunar Rover Vehicle and fractional scale models of a Lunar Module, Command Module, Saturn V and Skylab.

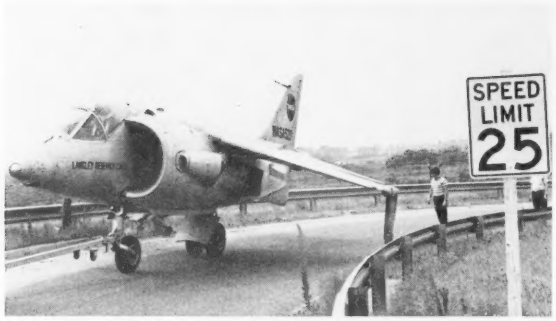
Expo '74 will continue through Nov. 3.

PROCUREMENT SEMINAR

The North Alabama Chapter of the Federal Bar Association will hold its Sixth Annual Seminar on Government Procurement at the Carriage Inn at Huntsville, AL, August 20-21.

One feature of the opening day will be a panel discussion to be participated in by Garland C. Buckner, Director of the Procurement Office at Marshall Space Flight Center; Paul Shnitzer, Associate General Counsel, U.S. General Accounting Office; William A. Parker, Jr., Deputy Director, Directorate for Procurement and Production, U.S. Army Missile Command, Redstone Arsenal; and William O. Turney, Chief, Contracts Office, Ballistic Missile Defense Systems Command, Huntsville.

AWARD FOR EXCELLENCE—Dr. James C. Fletcher (left), NASA Administrator, is pictured in Salt Lake City, UT, as he recently accepted the Golden Plate Award of the American Academy of Achievement from Dr. Willem Kolff, member of the Academy's Awards Council and inventor of the artificial kidney. The award is presented annually to "America's most inspiring exemplars of excellence in the great fields of endeavor."



SLOW PLANE TO HAMPTON—This British Kestrel, forerunner to the Harrier (AV-8A) vertical/short takeoff and landing (V/STOL) military jet aircraft, set a new record as the slowest airplane on Virginia Route 6 as it was recently towed from Langley Research Center to Hampton's Aerospace Park, where it was placed on public display. LaRC has conducted flight research on two such planes since 1966. The other has been transferred to the Smithsonian Institution in Washington.

LIFE SCIENTISTS NAMED

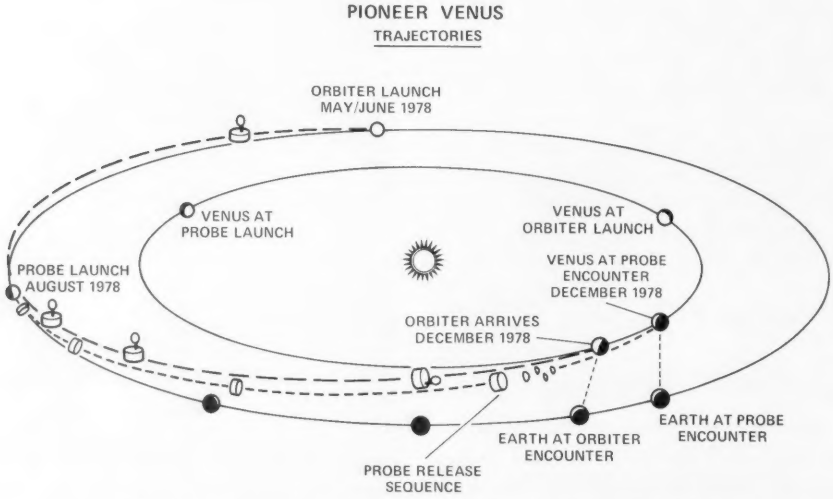
Four American scientists have been selected to work with NASA under the Life Scientist Program recommended by the National Academy of Sciences to increase participation in space and aeronautics-related research by the scientific community.

They are Dr. David J. Anderson, Kresge Hearing Research Institute, University of Michigan, Ann Arbor; Dr. Joseph Bragin, California State University at Los Angeles; Dr. John Oro, University of Houston; and Dr. Alfred R. Potvin, University of Texas, Arlington.

They were selected from nominations submitted by colleges and universities in response to invitations issued by the space agency last April. Each will spend approximately one year at a NASA center conducting special studies in life sciences related to space exploration. Dr. David L. Winter, NASA Director for Life Sciences, says the program holds great promise for broadening skills for all of NASA's life sciences activity.

Dr. Anderson will work at the Johnson Space Center on new and improved vestibular response measurement techniques. The others will be stationed at Ames Research Center, with the following assignments:

Dr. Bragin, a study of spectroscopy and photochemistry of amonium and hydrogen sulfides; Dr. Oro, research in the field of chemical evolution; and Dr. Potvin, studies associated with vestibular research.



TAKING A LOOK AT VENUS—This diagram shows the paths to be followed by two Pioneer Venus spacecraft that will be sent in 1978 to gather information about the atmosphere of Venus. Managed by Ames Research Center, an orbiter spacecraft will be launched in May of that year and an atmosphere probe in August, with both arriving in December. The longer broken line shows the orbiter's path and the shorter broken line that of the atmosphere probe.

NEW OFFICERS—Newly elected officers of the Spacecoast Chapter, Federally Employed Women, include, left to right, Kennedy Space Center's Linda Conway, treasurer; Pat Lowry, president; Joan Liddy, first vice president; Becky McBride, corresponding secretary; Myrtle Zita, second vice president, and Theresa Wright, recording secretary.

LUNAR SAMPLE EXHIBITS

The following is a schedule of lunar sample exhibits for Aug. 15 to Sept. 15:

COLORADO—High Flight Foundation, Colorado Springs, Aug. 15-Sept. 20.

IOWA—Iowa State Fair, Des Moines, Aug. 16-25.

KENTUCKY—Northern Kentucky State College, Dedication Ceremonies of new Science Building, Highland Heights, Sept. 13-30.

MICHIGAN—Astronomical League National Convention, Michigan State University, Lowell, Aug. 14-18.

MINNESOTA—Open House, Minneapolis Air Route Traffic Control Center, Farmington, Sept. 14.

NEW HAMPSHIRE—Capital Mineral Club Gem and Mineral Festival, Mount Sunapee State Park, Newbury, Aug. 18.

NEW JERSEY—Heritage Day Flea Market, Springfield, Sept. 8.

OHIO—Armstrong Air and Space Museum, Wapakoneta, July 8-Sept. 30; Lorraine County Fair, Wellington, Aug. 20-25.

OREGON—Lane County Fair, Fair Grounds, 796 W. 13th Avenue, Eugene, Aug. 13-18; Oregon State Fair, State Fairgrounds, Salem, Aug. 24-Sept. 2.

TEXAS—El Paso Cultural Fair, El Paso, Aug. 27-Sept. 10.

WASHINGTON—Expo '74, Spokane, Aug. 9-Oct. 31.

Permanent Displays

ALABAMA—Alabama Space and Rocket Center, Marshall Space Flight Center, Huntsville.

FLORIDA—Visitor Information Center, Kennedy Center.

KANSAS—Eisenhower Library, 200 SE 4th Street, Abilene.

NEW YORK—United Nations Building, New York City.

OHIO—U.S.A.F. Museum, Wright Patterson Air Force Base.

TEXAS—Johnson Library, University of Texas, Austin; Visitor Information Center, Johnson Space Center, Houston.

VIRGINIA—Visitor Information Center, Langley Research Center, Hampton.

WASHINGTON, DC—National Geographic Museum; Smithsonian Institution, National Air and Space Museum, 1000 Jefferson Drive.

HEADQUARTERS PRESS RELEASES

(Issued by the Public Information Division, Code FP, Headquarters, Washington, DC 20546. These releases are available only to members of the news media.)

74–173 Hinners New Head of Space Science Office
74–174 Note to Editors: NASA Begins New Feature Series
74–175 NASA Technology Helps Solve Environmental Problems
74–176 Space Photography Assists in Suit Over Florida Resource
74–177 Satellite Data Aids Texas in Resources Management
74–178 NASA to Award Shuttle SRM Contract to Thiokol
74–179 US/British Mission Will Probe Supernova Remnant
74–180 Thiokol Awarded Solid Rocket Motor Contract
74–181 GE's ASTP Support Contract Increased
74–182 Lockheed Named for White Sands Test Facility Support
74–183 AEROS-B Press Kit
74–184 First Lunar Landing Kite to Be Dedicated
74–185 NASA Develops Optical Memory Systems for Computer
74–186 "Quasars, Pulsars, Black Holes . . . and HEAOS" (booklet)
74–187 J. L. Jones Named to Deputy OAST Post
74–188 "Energy-Related Research and Development" (booklet)

RADIO-TELEVISION (Released Nationally)

August

TELEVISION—A color film release, the *Aeronautics and Space Report*, "Aerodynamic Truck Tests," (FRC).

RADIO—Four weekly *Space Story* programs are to be released: "Space Materials Applications," (JSC/R. C. Johnson); "Reusable Shuttle Status," (JSC/Thompson); "Airborne Astronomy," (ARC/Cameron); and "Spacelab," (MSFC/Powell). One monthly *NASA Special Report*, "NASA Energy Programs," featuring Dr. Schmitt, NASA Hqs. One set of ten 60-second announcements, *NASA Space Notes*, released quarterly.

PATENTS FOR INVENTIONS RESULTING FROM NASA RESEARCH

(The Office of General Counsel, NASA Headquarters, announces that the following U.S. patents have been issued by the U.S. Patent Office to NASA for inventions resulting from NASA research. Inquiries concerning them should be directed to the attention of the NASA Patent Counsel for the indicated installation.)

Inventor(s) and Employer	*Title and NASA Docket*	*Patent No.*	*Installation*
Kenneth W. Billman, Paul D. Rosley, James R. Stallcop and Leroy L. Presley, NASA/ARC	Method and Apparatus for Determining Properties of a Plasma (ARC–10,598–1)	3,817,622	ARC
Ronald G. Huff, NASA/LeRC	Jet Exhaust Noise Suppressor (LEW–11,286–1)	3,820,630	LeRC
Arthur W. Goldstein, NASA/LeRC	Supersonic Fan Blading (LEW–11,402–1)	3,820,918	LeRC
Warner B. Kaufman and Roland Breitwieser, NASA/LeRC	High Current Electrical Lead (LEW–10,950–1)	3,821,462	LeRC
James O. McClenahan, NASA/ARC	Photomultiplier Circuit Including Means for Rapidly Reducing the Sensitivity thereof (ARC–10,593–1)	3,821,546	ARC
Gerald V. Brown, NASA/LeRC	Magnetocaloric Pump (LEW–11,672–1)	3,819,299	LeRC
Billy R. Ashworth and John T. Merrill, NASA/LaRC	Apparatus for Applying Simulated G-Forces to an Arm of an Aircraft Simulator Pilot (LAR–10,550-1)	3,824,707	LaRC
John E. Turnage, Rodney Linford and Steve Cornish, McDonnell Douglas Corp., Huntington Beach, CA	Radiation Detector (MFS–21,577–1)	3,825,760	MSFC
Raymond L. Clark, NASA/LaRC	Apparatus and Method of Coating Small Particles (LAR–10,462–1)	3,826,226	LaRC
Warren H. Philipp, Stanley J. Marsik and Charles E. May, NASA/LeRC	Production of Pure Metals (LEW–10,906–1)	3,826,726	LeRC
David C. Byers and Bruce A. Banks, NASA/LeRC	Sputtering Holes with Ion Beamlets (LEW–11,646–1)	3,826,729	LeRC
Sanger M. Burk, Jr., NASA/LaRC	Deployable Flexible Ventral Fins for Use as an Emergency Spin Recovery Device in Aircraft (LAR–10,753–1)	3,826,448	LaRC

1974 LAUNCH SCHEDULE

Name	*Launch Date*	*Vehicle*	*Range*	*Mission/Remarks*	
Skynet II–A (UK)	Jan. 18	Delta	ETR	Reimbursable launch. United Kingdom's communications satellite.	Launched Vehicle failure
Centaur Proof Flight	Feb. 11	Titan III–E Centaur	ETR	Test flight of booster planned for Viking Mars launch in 1975.	Launched Engine failure
San Marco (SM–C2)	Feb. 18	Scout	SM	United States/Italy cooperative mission to conduct air density measurements.	Unsuccessful
UK X–4	Mar. 8	Scout	WTR	Reimbursable launch. United Kingdom technology satellite with experiments related to spacecraft power systems, attitude control and stabilization.	Successful
WESTAR–A	April 13	Delta	ETR	Western Union communications satellite. Reimbursable launch.	Successful
SMS–A	May 17	Delta	ETR	First prototype/developmental mission for geostationary meteorological operational satellite system; day and night continuous imaging of cloud cover; sophisticated remote-platform data-collection-and-weather data relay.	Launched
ATS–6	May 30	Titan III–C	ETR	Developmental and demonstrative communications mission using technology applicable to terrestrial and space needs; utilizes 9.15-meter (30-foot) deployable parabolic antenna and communications system with frequencies in several bands; will support public communications experiments in the U.S. and India.	Launched

1974 LAUNCH SCHEDULE—Cont.

Name	*Launch Date*	*Vehicle*	*Range*	*Mission/Remarks*	
Hawkeye (formerly Injun-F)	June 3 ..	Scout	WTR	To study the topology of the magnetic field at large radial distance over the Earth's dgear caps and the interaction of the solar winds with the geomagnetic field.	Launched
ITOS–G	July	Delta	WTR	Polar-orbiting operational meteorological satellite funded by NOAA; day and night cloud cover and temperature sounding.	
AEROS–B (German)	July 16 ..	Scout	WTR	Spin-stabilized, Earth-orbiting satellite designed for upper atmosphere measurements.	
Netherlands Sat.–A (ANS–A)	August 27	Scout	WTR	Designed to obtain data from celestial X-ray and ultraviolet sources.	
UK–5	Sept.	.....	.....	To investigate galactic and extra galactic X-ray sources.	
WESTAR–B	Sept.	Delta	ETR	Western Union communications satellite. Reimbursable launch.	
Intelsat IV F–8 ..	Sept.	A–Centaur ..	ETR	One of a series of communications satellites to form part of a global communication commercial satellite system. Launch for COMSAT.	
Helios–A	2nd Half	Titan III	ETR	To investigate the properties of and processes in interplanetary space in the direction of and close to the Sun by developing, launching and operating automated spacecraft.	
Skynet II–B (UK)	3rd Qtr. ..	Delta	ETR	Reimbursable launch. United Kingdom communications satellite.	
WESTAR–C	October ..	Delta	ETR	Western Union communications satellite. Reimbursable launch.	
Nimbus F	October	Delta	WTR	Meteorological research and development mission to test instruments for expanding atmospheric remote sensing to cloud regions, extend observations to new spectral regions, extend sounding capabilities to higher altitudes, demonstrate feasibility for improvements to operational systems, and support GATE.	
GEOS–C	December	Delta	WTR	Geodynamic Experimental Ocean Satellite to demonstrate feasibility of satellite-altimeter techniques for measuring the topography of the ocean surface; can be significant contribution to understanding of ocean dynamics.	
Comsat–A	4th Qtr. ..	Delta	ETR	First of two maritime communications satellites to be situated over Atlantic and Pacific Oceans.	
Symphonie–A (French/German)	4th Qtr. ..	Delta	ETR	Experimental communications satellite. Reimbursable.	
Intelsat IV F–1 ..	(Under Study)	.....	.....	One of a series of communications satellites to form part of a global communication commercial satellite system. Launch for COMSAT.	
Intelsat IV F–6 ..	(Under Study)	.....	.....	One of a series of communications satellites to form part of a global communications commercial satellite system. Launch for COMSAT.	
SMS–B	(Under Study)	Delta	ETR	Second prototype/developmental mission for geostationary meteorological operational satellite system; same as SMS–A; SMS–A and SMS–B will support GARP Atlantic Tropical Experiment (GATE).	
GOES–A (SMS–C)	(Under Study)	Delta	ETR	First Geostationary Operational Environmental Satellite, follow-on to SMS missions, funded by NOAA.	

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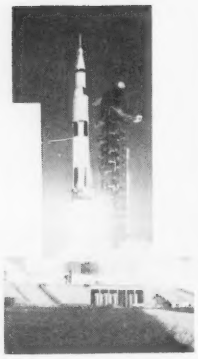
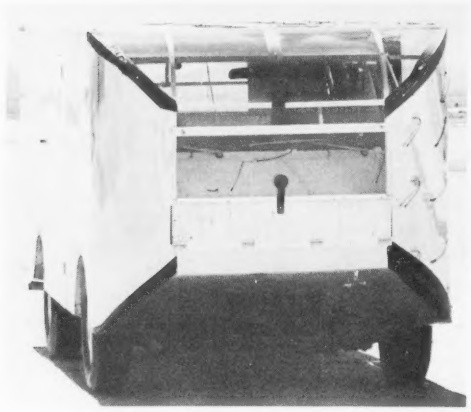


WORTH FROM SPACE?

FOR A PENNY OF YOUR TAX DOLLAR, YOU ARE GETTING ...

AERONAUTICAL RESEARCH . . . MORE TRUCK MILES PER GALLON, LESS POLLUTION



Techniques NASA has used in efforts to improve efficiency of aircraft now are being applied to trucks. The goal is a type of vehicle that can overcome the reduction in its speed and mileage caused by aerodynamic drag, or air resistance.

For months, at NASA's Flight Research Center at Edwards, CA, experiments have been conducted toward this end. One method adopted has been to change the box-like shape of vehicles by rounding corners to reduce the drag. Another is to cover the underbody so as to reduce the resistance caused by axles, muffler and differential.

The small truck in the illustration on the left was reshaped in such a way that the drag has been decreased a little more than 50 per cent, which translates into fuel savings of from 15 to 20 per cent at highway speeds. Also, various add-on aerodynamic devices are being added to big tractor trailers, such as that on the right, to smooth the flow of air around them.

Even a five per cent reduction in fuel consumption, it is pointed out, will mean a daily fuel saving of thousands of barrels, provided these aerodynamic principles are applied universally. In addition to fuel reduction, other benefits include less pollution and increased engine life.

"Actually, almost all of the vehicles that are on our highways today can profit substantially from streamlining and various aerodynamic fixes," assures Ed Saltzman, Project Engineer at FRC. "But the ones that will benefit most are those shaped to haul large loads, such as trucks, delivery vans, and motor homes."

NASA and the Department of Transportation are so convinced that vehicles can be made more economical to operate that they are cooperating in a $55,000, six-month research program. It is under the overall direction of Larry Montoya of FRC, who concentrates on experiments involving the larger trucks, while Saltzman centers his attention on the smaller vehicles.

NASA

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